

OSIRIS-REx will return a sample of asteroid 1999 RQ36 for astrochemistry

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Origins, Spectral Interpretation, Resource Identification, Security, Regolith Explorer (OSIRIS-REx) is the third mission in NASA's New Frontiers program. OSIRIS-REx launches in 2016 and will return the first pristine samples of carbonaceous material from the surface of a primitive asteroid in 2023. The target, (101955) 1999 RQ36, is 1/2 km diameter roughly spherical Apollo near-Earth asteroid. It is expected to be carbonaceous, similar to CI or CM carbonaceous chondrites. This organic-rich remnant from the early Solar System is also among the most potentially hazardous asteroids known with a 1 in 2500 chance of impacting the Earth in the late 22nd century. OSIRIS-REx will measure the Yarkovsky effect to better constrain future orbit and impact potential of this and other asteroids. OSIRIS-REx will image, map, and spectrally characterize RQ36 from 0.4-50 μ m. The returned sample of regolith will be >60g (and up to 2kg) and thus the largest extraterrestrial sample returned from space since Apollo 17. Unlike meteorites, the sample will come from a known, well-characterized source and will be collected and transported to Earth pristine from terrestrial contamination. It will be available for study by the global astrochemistry community to address fundamental questions about the origin and evolution of the solar system and the life it harbors.